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PUBLICATIONS AND PATENTS
of the
NORTHERN UTILIZATION RESEARCH AND DEVELOPMENT DIVISION
Peoria, Illinois, for the period

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In requesting single copies of publications, please note that if titles are marked with an asterisk (*), there is no supply of reprints available for distribution. Photostatic copies of most journal articles can be purchased at nominal cost through the Library of the U. S. Department of Agriculture, Washington 25, D. C.

Printed copies of patents, which are assigned to the Secretary of Agriculture, can be obtained only by purchase (25 cents each) from the U. S. Patent Office, Washington 25, D. C. Order by number, do not send stamps, and address orders to the Commissioner of Patents.

The abstracts for these publications and patents describe current research activities and indicate progress achieved by the Northern Division. Congress in 1938 authorized four regional laboratories to conduct basic and applied research designed to expand, improve, and develop through science and technology the utilization of American farm crops. Agricultural products assigned the Northern Division for study are: Wheat, corn, and other cereal grains; soybeans, flaxseed, and other oilseeds; grasses, forages, and new crops. Also studied are the straws, stalks, hulls, cobs, and other forms of agricultural residues from these products.

Previous lists of publications and patents were issued as NM-305, AIC-187, and AIC-318, with supplements. Copies of these lists are available on request.

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PUBLICATIONS

[Publications marked (*) are not available for distribution.]

*EXHAUST GAS COMPOSITION AND ENGINE WEAR,
C. W. Blessin, C. F. Elder, W. B. Roth, and Richard Wiebe.
Philippine Agr. Engin. J. VI(2): 49-56. 1957.

Engine wear appears to be caused largely by corrosion. Factors responsible for corrosion, which is a chemical phenomenon, are fuel and lubricant and their combustion or oxidation products. To investigate what extent alcohol-water injection might influence engine wear, collaborative work was carried out with the U. S. Bureau of Mines; the Engineer Research and Development Laboratories, Corps of Engineers, Department of the Army; and at the Southwest Research Institute under contract. Results indicate that, in general, alcohol-water injection does not appear to produce any harmful action and, in some instances, the presence of alcohol in fuel may reduce engine wear.

*EFFECT OF YEAR AND STATION WHERE GROWN ON FOUR PACIFIC NORTHWEST WHEAT VARIETIES,
M. M. MacMasters, R. A. Larkin, and I. M. Cull.
Amer. Miller and Processor 85(7): 34-35. July 1957. Also published in Assoc. of Operative Millers Bulletin: 2341-2342, September 1957, under the title, "Effect of Year and Station Where Grown on the Relationship Between Thickness of Endosperm Cell Walls and Milling Quality of Four Pacific Northwest Wheat Varieties".

Endosperm cell wall thickness of four Pacific Northwest wheat varieties was measured microscopically at 20 μ beneath the aleurone layer. Statistical analysis of the data showed that cell walls were not significantly affected by where or when the wheat was grown, but were significantly different between varieties. Elmar had the thinnest endosperm cell walls, followed by Federation and Idaed. Rex had the thickest.

The thickness of endosperm cell walls was related to three factors used to calculate milling score (patent flour yield, straight flour yield, and milling time), but not to a fourth (flour ash). A fifth factor (tempering moisture) was purposely held constant during experimental milling by the Western Wheat Quality Laboratory. The four varieties ranged from excellent to poor in milling quality.

A highly significant correlation ($r = -0.86$) was found between cell wall thickness and the milling score assigned by the Wheat Quality Laboratory. This relationship confirms conclusions drawn from earlier work that the thickness of endosperm cell walls is a varietal characteristic inversely related to the milling quality of Pacific Northwest wheats. Such a correlation was established for 10 varieties.

*WHEAT CONDITIONING.

M. M. MacMasters and Dorothy Bradbury.
Amer. Miller and Processor 85(7): 35-36. July 1957. Also published in Assoc. of Oper. Millers Bulletin: 2341. September 1957, under the title, "Progress on Preparation of Bibliography on Wheat Conditioning."

In a literature survey on tempering and conditioning of wheat about 800 references have been accumulated; many of these are in foreign languages, and are being translated as needed. Although few actual data have been found, it is evident that different conditioning is optimum not only for different classes of wheat, but for wheats of the same class but of different origin. Furthermore, conditioning to improve milling may have different requirements than conditioning to improve baking quality. This survey will be summarized in a complete bibliography, together with a summary of existing authoritative information and current theories.

S-(DICHLOROVINYL)-L-CYSTEINE: AN AGENT CAUSING FATAL APLASTIC ANEMIA IN CALVES.

L. L. McKinney, F. B. Weakley, A. C. Eldridge, R. E. Campbell, J. C. Cowan, J. C. Picken, Jr., and H. E. Biester.
J. of Amer. Chem. Soc. 79(14): 3932. July 1957.

Studies on trichloroethylene-extracted soybean oil meal (TESOM) have led to the synthesis of S-(dichlorovinyl)-L-cysteine. Oral administration of this compound to calves produced a refractory, hemorrhagic, aplastic anemia similar to that produced by TESOM.

STARCH FORMATE.

I. A. Wolff, D. W. Olds, and G. E. Hilbert.
J. of Amer. Chem. Soc. 79(14): 3860-3862. July 1957.

Formylation of starch under the conditions investigated is a reversible reaction; the extent of substitution is dependent upon the ratio of formic acid to starch and upon the water content of the system. Appreciation of this fact is required by workers who use formylation of cellulose for accessibility studies and refer to amylaceous materials as standards for comparison, assuming the latter to be 100% accessible. Maximum degree of substitution of starch achieved was 2.3 acyl groups per anhydroglucose unit.

MICROBIOLOGICAL PRODUCTION OF CAROTENOIDS. I. ZYGOSPORES AND CAROTENE PRODUCED BY INTRASPECIFIC AND INTERSPECIFIC CROSSES OF CHOANEPHORACEAE IN LIQUID MEDIA.

C. W. Hesseltine and R. F. Anderson.
Mycol. 49(4): 449-452. July-August 1957.

All available species of the Choanephoraceae produce zygospores when opposite mating types are inoculated together in appropriate liquid media. Yields of β-carotene are much higher in the mated strains than in either parent grown alone. Not only is this true within a species, but it also occurs when opposite mating types of different species are mated.

MIXED ESTERS OF AMYLOSE.

Ivan A. Wolff, David W. Olds, and G. E. Hilbert.
Indus. and Engin. Chem. 49(8): 1247-1248. August 1957.

The preparation, solubility, and film-forming characteristics of selected, fully substituted, mixed aliphatic-acid esters of amylose are described. Formyl esters are too easily hydrolyzed to give products of desirable stability. Acetate-propionate and acetate-butyrate esters are more soluble in organic solvents than the triacetate. Films prepared from the mixed esters are more flexible and extensible but are somewhat weaker than acetate films.

SEPARATION OF THE OXIDATION PRODUCTS OF FATTY ACIDS BY MEANS OF GAS-LIQUID PARTITION CHROMATOGRAPHY.

Janina Nowakowska, E. H. Melvin, and Richard Wiebe.
J. of Amer. Oil Chem. Soc. 34(8): 411-414. August 1957.

Separation of mixtures of methyl esters of monocarboxylic fatty acids through C_{18} and of dicarboxylic acids through C_{10} was accomplished by means of gas-liquid partition chromatography. The method has been used to study the oxidation products of C_{18} unsaturated fatty acids: Oleic, linoleic, and linolenic, as well as oxidized fatty acids from soybean oil. The chromatograms of oxidized acids revealed a number of components which were neither expected in the original fatty acids nor known to result from the oxidation process. Some of them have not yet been identified. The method is being studied as a tool for compositional studies of vegetable oils.

APPARENT INCREASE IN FREQUENCY OF INFECTIONS INVOLVING *TORULOPSIS GLABRATA*. PROCEDURE FOR ITS IDENTIFICATION.

Lynferd J. Wickerham.
Amer. Med. Assoc. J. 165(1): 47-48. September 1957.

There is some indication that *Torulopsis glabrata*, previously considered slightly pathogenic or nonpathogenic, is now becoming more common and in some cases may cause very serious infections. This paper is written to alert physicians to its occurrence and to inform technicians regarding its identification.

OXYGEN ABSORPTION RATES IN LABORATORY AND PILOT-PLANT EQUIPMENT.

J. Corman, H. M. Tsuchiya, H. J. Koepsell, R. G. Benedict, S. E. Kelley, V. H. Feger, R. G. Dworschack, and R. W. Jackson.
Appl. Microbiol. 5(5): 313-318. September 1957.

A modified procedure for oxygen absorption rate (OAR) determinations is described and used to evaluate aerobic conditions in snaken flasks and pilot-plant fermentors.

A wide range of OAR values may be obtained by proper selection of fluid volumes and sizes of culture flasks agitated on a reciprocal shaker at variable speeds. Vertical indentations spaced evenly about the base of the culture flasks substantially increase OAR values. The type of flask closure has a significant effect on OAR. The relationship between size of modified flasks and eccentricity of a rotary shaker influences the extent of turbulence which in turn affects OAR.

Installations of baffles in a fermentor improves the utilization of air supplied, especially at low and intermediate aeration rates. Antifoam agents markedly depress OAR values.

PROGRESS IN SOYBEAN RESEARCH.
J. C. Cowan.
Soybean Digest 17(11): 64-66. September 1957.

Three lines of work on soybeans are reviewed: Toxicity of trichloroethylene-extracted soybean oil meal and S-(dichlorovinyl)-cysteine, flavor stability of edible soybean oil, and polymers of soybean vinyl ethers as coatings.

RECORDING APPARATUS FOR MEASURING SOME MIXING CHARACTERISTICS OF FLOUR-WATER BATTERS.
R. A. Anderson and E. B. Lancaster.
Cereal Chem. 34(5): 379-388. September 1957.

A recording apparatus for determining some mixing characteristics of flour-water batters was developed and constructed. The apparatus continuously measures and records the power required to mix the batter while it is being prepared. Mixing curves obtained show interesting variations between flours prepared from different types of wheat as well as between flours milled from the same wheat but treated in different ways.

STUDIES ON THE AEROBIC PROPAGATION OF *SERRATIA MARCESCENS*.
R. G. Benedict, H. J. Koepsell, H. M. Tsuchiya, E. S. Sharpe, J. Corman, C. E. Kemp, G. B. Meyers, and R. W. Jackson.
Appl. Microbiol. 5(5): 308-313. September 1957.

In a survey using 14 different media, abundant aeration was found to be an essential requirement to produce maximum counts of viable cells and to achieve dense populations of *Serratia marcescens* 8 UK, NRRL B-1481. Frozen and thawed whole cultures used as a source of inocula gave reproducible fermentations.

Using the chosen medium of skim milk powder, protopeptone, and glucose with an oxygen absorption rate of 3.0 millimoles per liter per minute, counts up to 260 billion viable cells per ml were obtained after 22 hours' incubation at 28°C. in shaken flasks. Techniques developed were readily scaled up for fermentations in 20-liter vat fermentors.

TOXIC PROTEIN FROM TRICHLOROETHYLENE-EXTRACTED SOYBEAN OIL MEAL.
L. L. McKinney, F. B. Weakley, R. E. Campbell, A. C. Eldridge, J. C. Cowan, J. C. Picken, Jr., and N. L. Jacobson.
The J. of the Amer. Oil Chemists' Soc. 34(9): 461-466. September 1957.

Fractionation studies show that the toxicity of trichloroethylene-extracted soybean oil meal resides in the protein component of the meal. The toxic principle is labile to acid and alkali.

AN ULTRACENTRIFUGAL STUDY ON THE ASSOCIATION-DISSOCIATION OF GLYCININ IN ACID SOLUTION.
Joseph J. Rackis, A. K. Smith, G. E. Babcock, and H. A. Sasame.
J. of Amer. Chem. Soc. 79(17): 4655-4658. September 1957.

Glycinin refers to phytate-free protein that precipitates from an aqueous extract of soybean meal at pH 5.1. Ultracentrifugal studies were conducted to discern the effect of pH, ionic strength, and influence of various salts on the behavior of glycinin in acid systems. Results indicate that glycinin in acid solution is a freely reversible association-dissociation system containing three resolvable fractions having s_{20} values of approximately 2S, 7S, and 13S. An unresolvable fraction having an s_{20} value $>$13S is also present. The relative amounts of the unresolvable fraction, as well as the

resolvable components, are dependent upon pH, ionic strength, and type of salt present. Low pH and low ionic strength favor dissociation primarily into the 2S and 7S fractions. Mono- and divalent cations shift the equilibrium toward dissociation. Experiments with calcium chloride, sodium chloride, and sodium sulfate indicate that sulfate ions cause a marked shift in association towards formation of large amounts of unresolved, high molecular-weight material.

NOTES ON THE CHOANEPHORACEAE.

C. W. Hesseltine and C. R. Benjamin.
Mycol. 49(5): 723-733. September - October 1957.

Blakeslea circinans Naganishi and Kawakami has been made into the new combination *Choanephora circinans*. Description of its growth on synthetic mucor agar and its natural distribution are given. Zygospores are reported for the first time and are similar to those observed in other species of *Choanephora*. Imperfect hybridization between certain species of *Choanephora* is reported. Evidence is presented for maintaining the species, *C. conjuncta* Couch.

EVALUATION OF MONOETHANOLAMINE METHOD OF CELLULOSE DETERMINATION FOR AGRICULTURAL RESIDUES.

Gussie H. Nelson and Julia A. Leming.
TAPPI 40(10): 846-850. October 1957.

The monoethanolamine (MEA) method for determining cellulose was evaluated by studying the effects of time and temperature of refluxing, bleaching conditions, and MEA-solids ratio. The MEA method was applied to 57 agricultral residue materials and its precision was measured.

FIBER SHIPPING CONTAINERS FROM SUGARCANE BAGASSE.

E. C. Lathrop, S. I. Aronovsky, S. B. Knapp, F. W. O'Neil, R. G. Hitchings, A. J. Ernst, and T. F. Clark.
TAPPI 40(10): 787-791. October 1957. (Condensed Report)
U. S. Dept. Agr. ARS-71-10, (Processed) 70 pp. November 1957. (Detailed Report)

Utility of sugarcane bagasse for production of corrugated shipping container board was demonstrated through laboratory, pilot-plant, and semicommercial-scale operations. Corrugating and liners in 40-inch trim were produced in continuous machine operation from Mechanro-Chemical pulps of Florida and Hawaiian bagasse fiber. A commercial box shop fabricated shipping containers from experimental boards and commercial controls. In all, 23 combinations of boards were produced and evaluated in laboratory tests and in commercial shipping tests. Results showed that container boards prepared from bagasse are competitive to commercial products in quality and physical characteristics.

ION-EXCHANGE MICROMETHODS FOR SEPARATION OF FERMENTATION ACIDS. DETERMINATION OF FUMARIC ACID IN FERMENTATION BROTH.

Cecil H. VanEtten and Clara E. McGrew.
Analyt. Chem. 29(10): 1506-1509. October 1957.

A simple routine method using micro ion-exchange columns and samples of about 0.15 milliequivalent total acid was developed and applied to the determination of the fumaric acid content of fermentation broths. The methods also measured the total acids present in the fermentation and estimated the nonvolatile weak and the nonvolatile strong acids, and the volatile acids by difference. Using a strongly basic anion exchange resin with 0.35N-acetic acid as the elutriant, it was found that all acids tested which had a dissociation constant K_1 of 4×10^{-4} or less (designated weak acids) were eluted, while under the same conditions of elution those acids tested having dissociation constants K_1 of 8×10^{-4} or greater (designated strong acids) were not eluted. Because of its lack of affinity for the anion resin in alcohol, fumaric acid was separated from the remaining strong acids, except aconitic, by its elution from the anion resin in 90% tertiary butyl alcohol. Recovery of fumaric acid added to the fermentation broth was 98.2% with a standard deviation of 1.52.

PROPERTIES OF DEXTRANS ISOLATED FROM WHOLE CULTURES AT VARIOUS STAGES OF INCUBATION.

Allene Jeanes, C. A. Wilham, H. M. Tsuchiya, and W. C. Haynes.
Arch. of Biochem. and Biophys. 71(2): 293-302. October 1957.

Information was sought as to whether strains other than *Leuconostoc mesenteroides* NRRL B-512 modified their dextrans during extended incubation after completion of dextran production. Cultures of 1 strain from each 3 species were incubated for 49 days, and at intervals aliquots were taken for isolation, purification, and characterization of the dextran products. Characterization data include periodate oxidation values, specific rotation, intrinsic viscosity, and analytical fractionation. Dextran from these three strains representing a diversity of structures were shown to remain unchanged in the cultures. Under the same conditions, dextran from strain B-512 became partially degraded.

DETERMINATION OF TOCOPHEROL IN OXIDIZED FATS.

E. N. Frankel, C. D. Evans, and J. C. Cowan.
The J. of the Amer. Oil Chemists' Soc. 34(11): 544-546. November 1957.

A simple heating method yields a higher recovery of tocopherol in oxidized fats than other modifications of the Emmerie-Engel method used to remove interfering peroxides. Heating oxidized fats to 210° C. under reduced pressure for 10 to 15 minutes is effective in removing peroxides without affecting the tocopherol content. Oxidized soybean oil analyzed by this method showed a loss of less than 10% of its original tocopherol content after oxidation beyond the induction period. Data indicate that no tocopherol is regenerated in the oxidized oils by the heat treatment; therefore, the accepted view that tocopherol is completely destroyed in all fats oxidized beyond the induction period needs re-evaluation for vegetable oils.

THE EFFECT OF POTASSIUM UPON THE GROWTH OF *MICROCOCCUS PYOGENES*. II. THE INFLUENCE OF INCUBATION TEMPERATURE AND GLUCOSE.

William C. Haynes, Ralph W. Kuehne, and Lenora J. Rhodes.

Appl. Microbiol. 5(6): 382-385. November 1957.

Strains of *Micrococcus pyogenes (Staphylococcus aureus* and *Staphylococcus albus)* are found to be heterogeneous in the temperatures they prefer for growth. Those that grow best at 30° C. respond to adequate levels of potassium by producing greater numbers of colony predecessors and more cell substance. If they are incubated at 37° C., the increases are considerably less. The presence of glucose in 37° C. cultures further modifies the stimulatory effect of potassium. The generally wide tolerance of these microorganisms to excess potassium is narrowed by the same factors, *i.e.*, incubation at 37° C. and inclusion of glucose in the medium.

MOISTURE RELATIONS IN WHEAT AND CORN.

J. E. Hubbard, F. R. Earle, and F. R. Senti.

Cereal Chem. 34(6): 422-433. November 1957.

Hysteresis loops were established for wheat and corn at 25°, 30°, and 35° C. over the range 0 to 97% relative humidity. Both desorption and adsorption isotherms for corn and and wheat were found to be sigmoid. The maximum hysteresis effect was found between 12 and 44% humidity amounting to 1.6% and diminishing to less than 0.2% at 92% humidity.

No consistent differences were found in the extent of hysteresis with temperature changes over the range of temperatures studied. Hygroscopic capacity of grain shows a negative correlation with temperature; a rise in temperature of 10° C. lowers the equilibrium moisture content by as much as 1.3%.

The equilibrium relative humidity of the interseed air, as measured with an electric hygrometer, and the moisture content, as measured with an electric moisture meter, were determined on 114 commercial samples of wheat and corn. Values found were shown to lie, for the most part, in the expected range of the hysteresis loops established.

Observations were made on the relative importance of moisture content of grain or on relative humidity of interseed air near the critical levels for mold growth.

PAPER PULP FROM SUGARCANE BAGASSE BY THE SULPHATE PROCESS.

A. J. Ernst, G. H. Nelson, and S. B. Knapp.

TAPPI 40(11): 873-879. November 1957.

Experimental data on chemical composition and pulping characteristics of bagasse samples from various sugar-producing areas are presented for pulps from: (a) Single lot of separated fiber by the sulfate process under a variety of conditions, (b) separated fiber from varieties in several geographical areas by a uniform sulfate pulping treatment, and (c) whole bagasse and separated fiber by the same uniform sulfate pulping treatment. Proximate chemical composition of bagasse and separated fiber, pulping chemical requirements, pulp yields, strength characteristics of pulps, and bleach requirements vary with variety and location of bagasse. Digestion with 13% chemicals for 1 hour at 170° C. produced good pulps from separated bagasse fiber. Separation of pith and dirt from bagasse is highly desirable in producing pulps of high quality.

A RAPID TURBIDIMETRIC METHOD FOR DETERMINATION OF ZEIN.
E. M. Craine, Carol A. Jones, and Joyce A. Boundy.
Cereal Chem. 34(6): 456-462. November 1957.

A rapid and simple turbidimetric method is described to determine zein dissolved in ethanol-water systems. The method is based on the formation of a reproducible suspension of colloidal particles when a salt solution is added to a dispersion of zein.

In concentration range of 100-1000 μg zein was determined by measurement of turbidity by means of a spectrophotometer. At concentrations less than 100 μg a nephelometer was used for greater sensitivity.

CHLOROUS ACID OXIDATION OF PERIODATE OXIDIZED CORNSTARCH.
B. T. Hofreiter, I. A. Wolff, and C. L. Mehltretter.
J. of Amer. Chem. Soc. 79(24): 6457-6460. December 1957.

Periodate oxystarches prepared from cornstarch containing from 5 to 100% of dialdehyde units have been quantitatively converted to the corresponding dicarboxyl derivatives by oxidation with chlorous acid. The reactions take place in aqueous acid medium and the products are isolated in good yield by precipitation with alcohol. Following investigation of reaction variables, preferred conditions found for the oxidation were: 1M sodium chlorite, 0.5M acetic acid, mole ratio sodium chlorite/aldehyde of 4, 25° C., and 3 hours' reaction time.

INFRARED SPECTROSCOPY AND OPTICAL ROTARY DISPERSION OF ZEIN, WHEAT GLUTEN AND GLIADIN.
Carl B. Kretschmer.
J. of Phys. Chem. 61(12): 1627-1631. December 1957.

Infrared spectra of zein, wheat gluten, and gliadin were examined. Oriented films, prepared by rolling, were shown by their dichroism and the frequency of the amide II band at 1520 $cm.^{-1}$ to be in the β configuration; nevertheless, the amide I band was near 1660 $cm.^{-1}$, the frequency normally observed in α polypeptides. On the basis of the shape of the amide II band before and after rolling, it is believed that these cereal proteins in the unoriented solid state are mixtures of alpha and beta forms. Rolling orients the beta material; it also transforms additional material to the beta form and orients it.

Measurements of optical rotatory dispersion indicate that zein in 80% ethanol has a helical content of 50%, while gliadin in 70% ethanol and gluten in dilute acid have helical contents of about 35%.

PRESENCE OF NITRITE-ASSIMILATING SPECIES OF *DEBARYOMYCES* IN LUNCH MEATS.
Lynferd J. Wickerham.
J. of Bact. 74(6): 832-833. December 1957.

Yeasts of the genus *Debaryomyces* isolated from lunch meat were found to assimilate nitrite but not nitrate. These yeasts are evidently the first discovered to have this combination of biochemical properties. Because *Debaryomyces* are commonly found in meats to which nitrite and nitrate have been added as preservatives, this report should be of interest to food bacteriologists.

THE GENUS SYZYGITES (MUCORACEAE).

C. W. Hesseltine.

Lloydia, 20(4): 228-237. December 1957.

The generic name, *Syzygites* Ehrenberg ex Fries, has priority over the generic name *Sporodinia* Link according to evidence found in a review of the history of the genus and its single species, *S. megalocarpus*. Following a study of numerous isolates of the genus grown on synthetic mucor medium, the genus and species are redescribed, ranges of morphological variations were determined, and numerous synonyms of the genus and species are enumerated.

*PHOSPHATIDYL ETHANOLAMINE.

C. R. Scholfield and H. J. Dutton.

In "Biochemical Preparations", edited by David Shemin, Vol. 5, pp. 5-8, John Wiley and Sons, Inc., New York (1957).

For the first time a laboratory method is described for preparing and isolating phosphatidyl ethanolamine from soybean phosphatides. The alcohol-insoluble fraction of soybean phosphatides is dissolved in chloroform and poured into methanol. Insoluble material is removed by filtration. Lead acetate is added to the methanol solution in in order to precipitate inositol-containing phosphatidic acids and other impurities. Phosphatidyl ethanolamine remaining in the methanol solution is recovered in about 85% purity. The impurity is mainly sugar-containing material believed to be sterol glycosides.

MODIFICATION OF ZEIN BY DEAMIDATION.

L. L. McKinney and V. L. Johnsen.

Trans. Illinois State Acad. Sci. 50: 90-95. 1957.

The non-peptide amide groups of zein were preferentially hydrolyzed to carboxyl groups to give an acidic protein. The deamidated zein became soluble at a neutral pH when about 40% of the total non-peptide amide groups were hydrolyzed and could be precipitated by adjusting the pH to 4.0.

CONTRACT RESEARCH PUBLICATIONS

(Report of research work done by outside agencies under contract with the U. S. Department of Agriculture and supervised by the Northern Utilization Research and Development Division of the Agricultural Research Service.)

*STRUCTURE OF CORN HULL HEMICELLULOSE. PART VI. THE SYNTHESIS OF 5-O-β-D-GALACTOPYRANOSYL-L-ARABINOSE.

Irwin J. Goldstein, F. Smith, and H. C. Srivastava. University of Minnesota, St. Paul, Minnesota.

J. of the Amer. Chem. Soc. 79(14): 3858-3860. July 1957.

THE ISOLATION AND CHARACTERIZATION OF THE POLYMERS FORMED DURING THE AUTOXIDATION OF ETHYL LINOLENATE.

L. A. Witting, S. S. Chang, and F. A. Kummerow. University of Illinois, Urbana, Illinois.
The J. of the Amer. Oil Chemists' Soc. 34(9): 470-473. September 1957.

SPHINGOLIPIDES.

H. E. Carter, Dimitris S. Galanos, R. H. Gigg, John H. Law, Teishi Nakayama, D. B. Smith, and Evelyn J. Weber. University of Illinois, Urbana, Illinois.
Fed. Proc. 16(3): 817-825. September 1957.

SOME REACTIVITY RATIOS OF ESTERS OF ACRYLIC ACID.

C. S. Marvel and Roland Schwen. University of Illinois, Urbana, Illinois.
J. of Amer. Chem. Soc. 79(22): 6003-6005. November 1957.

EVALUATION OF GROUND CORNCOBS AND CORNCOB COMPONENTS AS NUTRITIVE MATERIALS IN RATIONS FOR BEEF CATTLE.

J. Matsushima, T. W. Dowe, and V. H. Arthaud. University of Nebraska, College of Agriculture, Lincoln, Nebraska.
Research Bulletin 185: 19 pp. December 1957.

JOINT PUBLICATION

A CONTINUOUS FREEZE DRIER FOR LABORATORY STUDIES.

M. Rhian, H. G. Maister, and R. S. Hutton. Fort Detrick, Frederick, Maryland.
Appl. Microbiol. 5(5): 323-331. September 1957.

PATENTS

These patents are assigned to the Secretary of Agriculture. Copies of patents may be purchased from the U. S. Patent Office, Washington, D. C.

METHOD OF PURIFYING PHOSPHATIDYL ETHANOLAMINE.
Charles R. Scholfield and Herbert J. Dutton.
U. S. Patent 2,801,255. July 30, 1957.

The alcohol insoluble fraction of vegetable phosphatides such as soybean lecithin is rendered sugar-free and coline-free by extraction with aqueous hexane-alcohol. The fraction is extracted with water-saturated chloroform, and lead salts are added to the extract to precipitate insoluble lead compounds. Phosphatidyl ethanolamine is recovered from the remaining extract.

MANUFACTURE OF EMULSION-TYPE SAUSAGES.
Elmer F. Glabe.
U. S. Patent 2,803,547. August 20, 1957.

A small amount of Gelsoy and sodium hexametaphosphate are incorporated in emulsion-type sausages to stabilize the product and improve its texture.

STABILIZATION OF OIL-CONTAINING COMPOSITIONS WITH REDUCTONES.
John E. Hodge and Cyril D. Evans.
U. S. Patent 2,806,794. September 17, 1957.

Fatty oils or oil-containing compositions are stabilized against oxidative deterioration by the addition of minor amounts of amino-glycose-reductones, or anhydro-amino-glycose-reductones. In lard a synergistic effect is manifest when these reductones are used in combination with ascorbic acid.

CALCIUM SALT OF CONDENSATION PRODUCT OF CITRIC AND GLUCONIC ACIDS.
Charles L. Mehltretter.
U. S. Patent 2,813,892. November 19, 1957.

This invention relates to a novel composition of matter, namely, the calcium salt of a condensation product of citric and gluconic acids which is prepared by heating equimolar quantities of citric acid with gluconic acid or glucono-delta-lactone for several hours at 100°-150° C., neutralizing the reaction mixture with calcium carbonate and precipitating the product by means of alcohol addition.

MANUFACTURE OF SAUSAGES.
Elmer F. Glabe.
U. S. Patent 2,816,035. December 10, 1957.

Soybean material that has been freed from oil is first extracted with a lower alcohol and then extracted with water and the extract evaporated. A small proportion of the dried material is added to emulsion-type sausages to improve the water retention and physical stability.